

**MANAGEMENT PLAN
HAYSTACK WETLANDS MITIGATION PROJECT
PETALUMA, SONOMA COUNTY, CALIFORNIA
USACE File No. 28104N**

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I Introduction

A Purpose of Project

This report presents the management plan for the proposed Dutra Haystack Wetland Mitigation Project (project) to be developed on approximately 17 acres of the proposed Dutra Haystack Asphalt Plant located at 3355 Petaluma Boulevard South bordering Petaluma in Sonoma County, California (Figure 1). San Rafael Rock Quarry, Inc., dba Dutra Materials ("Dutra") is proposing to establish an asphalt plant facility and associated conveying system to the approximately 35-acre Haystack Landing project site. The facility will take delivery of aggregate and sand from the Landing Way barge offload facility and process some aggregate into the finished asphalt product and sell the remainder of the aggregate directly to the public. The offloading will occur at the Landing Way barge off-loading facility (owned by Shamrock Materials, Inc.) located at 210 Landing Way in Petaluma, and will be transferred by an enclosed electric conveyor on the Landing Way property, over the Barton property to the south and cross over the Northern Pacific Railroad Tracks to the Haystack property to the southwest. At the Haystack site, the material will be deposited into stockpiles at the proposed asphalt facility.

Dutra initially proposed construction of an asphalt plant resulting in the filling of approximately 1.37 acre of seasonal wetland subject to U.S. Army Corps of Engineers (Corps) jurisdiction pursuant to Section 404 of the Clean Water Act on the project site and removal of another 0.47 acre of seasonal wetland on an the Landing Way site to construct and maintain an electronic conveyor system to transfer aggregate materials from barges on the Petaluma River to the asphalt plant.

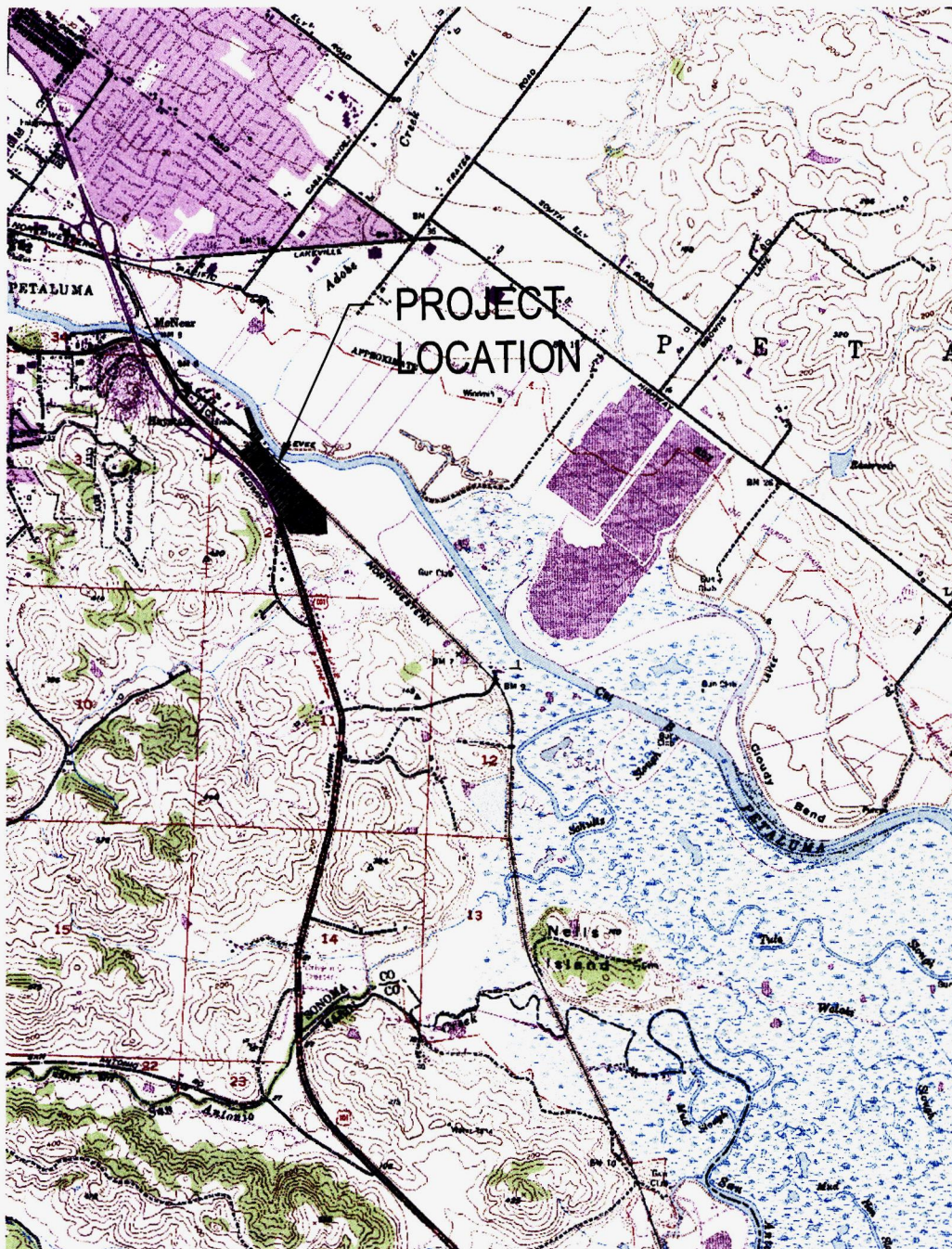
Through analysis of potential alternatives Dutra has developed an alternative that would avoid filling 1.32 acres of wetland proposed to be filled under the proposed project. This Reduced Fill Alternative, which Dutra now proposes instead of the initially proposed project, would fill only 0.52 acre of wetland.

In connection with the initially proposed project, Dutra also developed a plan to mitigate the wetland impacts of that project. The Reduced Fill Alternative would fill only 0.52 acre of wetland, less than one third the 1.84 acres of wetlands proposed to be filled by the initially proposed project. While that reduction of wetland impacts naturally warrants corresponding reduction of mitigation, Dutra has decided nonetheless to propose substantially the same mitigation it had developed for the proposed project.

This management plan proposes short and long-term management strategies for the wetland mitigation area in perpetuity.

The proposed mitigation project would include the following:

- creation of 2.66 acres seasonally inundated wetland
- enhancement of 8.21 acres seasonally inundated wetland
- restoration of 0.02 acres of brackish marsh fronting the Petaluma River
- preservation of 0.57 acre seasonally inundated wetland
- enhancement of 3.12 upland buffer zone



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**DUTRA HAYSTACK ASPHALT FACILITY
 USGS MAP
 OVERALL SITE PLAN**

SONOMA

FIGURE 1

CALIFORNIA

The approving agencies for this project include the U.S. Army Corps of Engineers (USACE) and San Francisco Bay Regional Water Quality Control Board (SFRWQCB).

B Purpose of this Management Plan

The purpose of the Management Plan is to establish tasks to monitor the various wetland habitats within the mitigation area. This Management Plan is considered the interim and long-term management plan and is a binding and enforceable instrument to be implemented by the Land Manager.

C Land Manager

The Land Manager for the property will be a natural resource management organization approved by the USACE. If no land manager can be found, the applicant will retain ownership of the property and its associated management responsibilities. The Land Manager will be responsible for mitigation monitoring and cooperatively working with the agencies to manage the property in perpetuity.

II Property Description

A Project Setting

The Haystack Landing project site consists of three assessor parcels on the Petaluma River USGS quadrangle in the middle portion of Section 2 in Sonoma County, California. Two of these parcels (APN 019-320-023 and APN 019-320-022) form an approximately 35-acre trapezoidal parcel bound to the east by the Sonoma Marin Area Rail Transit tracks and to the west by Highway 101 (hereafter jointly referred to as Parcel A). The third parcel (APN 019-220-001) occurs east of the railroad tracks and fronts the Petaluma River (also known as the Barton Parcel, hereafter referred to as Parcel B). Finally, a portion of the Landing Way Facility (approximately 0.47 acre) would be used to construct an electric conveyor that would transport materials off-loaded at the Shamrock Materials, Inc. Landing Way facility to the 35-acre parcel where the asphalt plant will be constructed.

B History and Land Use

Historically, Parcel A was used as a dairy farm until 1968 when the site was purchased by American Rock and later Dutra. The northern 27 acres of the site were leased back to the dairy rancher and the remaining 10+- acres located in the southern portion of the site were used for the disposal of quarry wash water transferred from a quarry located on the west side of Highway 101 just north of the project site. Since 1968, various dikes and siltation ponds were

constructed on the Haystack site; eventually five siltation ponds were constructed for settling quarry wash water. In 1976, the northernmost siltation pond was filled with earthen material excavated from an adjacent hill. The remaining ponds, including the one originally constructed in 1968 at the southernmost portion of the site, were actively used by the quarry for the disposal of quarry wash water until the mid-1970s. Two of the ponds located on the southwestern portion of the site were in continuous use until at least 1990¹. According to the current property owners, none of the siltation ponds have been actively used for quarry or other operations since 1990. An historic farmhouse occurred on the northern 4 acres of the project site until it burned down in 2004. Several barns and outbuildings used to store miscellaneous materials located south of the house were demolished in 2004 as permitted by a County demolition permit as well.

Parcel B fronts the Petaluma River and covers approximately 0.8 acre of relatively flat land. Historically this site had a small residence on it and was primarily vegetated with non-native grasses and various shrubs including coyote bush.

The Landing Way property was historically a dredge disposal area until the Landing Way Operational Facility (an aggregate distribution facility) was constructed in 2005.

C *Geology, Soils, Climate, and Hydrology*

The project site has climate characteristics similar to other locations on the lowlands surrounding the northwest corner of San Pablo Bay. In general, the site is located in the Mediterranean climate zone typical of central coastal California. This climate zone is characterized by cool, wet winters and hot, dry summers tempered, in this case, by proximity to San Pablo Bay and by the occurrence of occasional coastal fog, especially in late spring and summer. The windiest months are May and June, when turbidities in the Bay and Petaluma River can frequently persist at levels of 200 to 500 nephelometric turbidity units (NTUs).

Situated in the 'rain shadow' of coastal mountains, the project site receives a mean annual precipitation of approximately 22 inches. The average rainfall value is the statistical mean of rainfall totals that show a wide range of values strongly influenced by global weather patterns, such as the El Nino Southern Oscillation and prolonged periods of drought. The location of the site north and east of Bolinas and Big Rock Ridges, Mount Burdell and Chileno Valley hills, and west of the Sonoma Mountains strongly influences event totals.

Reference evapotranspiration at Petaluma averages 44 inches per year.² Reference evapotranspiration is the evapotranspiration of a well-watered 4- to 6-inch tall cool-season grass; evapotranspiration from small seasonally inundated or emergent wetland vegetation can be 10 to 15 percent higher.

¹ LSA Associates, Inc. 1995. *Determination of Corps Jurisdictional Area, Haystack Landing, Petaluma*.

² California Irrigation Management Information System (CIMIS) station 144; <http://www.cimis.water.ca.gov/cimis/frontStationDetailInfo.do?stationId=144&src=info>; Station averages: Jan 0.98, Feb 1.65, Mar 2.81, Apr 4.25, May 5.61, Jun, 6.26, Jul 6.47, Aug 5.86, Sep 4.49, Oct 3.05, Nov 1.54, Dec 0.98, Annual 43.95 inches.

The project site is situated in the upper reaches of the tidally-influenced portion of the Petaluma River, in a zone of transition between freshwater runoff and saline water of the San Pablo Bay. It is on the western flank of the valley, on lowlands adjacent to shallow 400- to 500-foot hills having roughly 30-percent slopes, in an area characteristic for tidal-fringe habitats. A mile upstream, the Town of Petaluma is a classic 'bridge point' town, founded at the head of tidewater, at another transition from fresher headwater habitats to downstream salt-marsh habitats. Hence, the site affords an opportunity to restore much of the same types of landward-edge-of-tidewater wetlands upon which much of downtown Petaluma has been established, and which has disproportionately been filled or affected – both in the Petaluma River system, and throughout the San Francisco Bay region.

In the vicinity of the project site, river salinity seasonally fluctuates down to about 7 parts per thousand (ppt) during wet-season runoff and increases to about 25 ppt during dry-season baseflow. Tidal water circulates onto the project site through a 20-foot wide slough east of the Sonoma Marin Area Rail Transit (NWPRR) tracks, and beneath the tracks through a 2-foot by 2-foot old wooden box culvert. Flow through the culvert is constrained by sediment, aquatic growth and floating debris. West of the tracks, tidal waters flow in the ditch along the tracks and onto the project site via various drainage ditches. Tidal action reaches an off-site diked pond of about 8 to 10 acre-feet in size located to the southeast of Parcel A.

On Parcel A, tidal circulation is limited to the drainage ditches, and only during the highest, primarily winter tides does water spill from drainage ditch DD2 to Wetland H. The ditches on-site drain poorly relative to the off-site railroad-track ditch and slough downstream, and always have water below 2.6-foot elevation, owing to the nearly level channel slope, accumulated sediment and wetland vegetation above the confluences. Mean High Water (MHW) is 3.0-foot elevation, and Mean Higher High Water (MHHW) is 3.4 foot elevation. These elevations are optimal for pickleweed colonization.

On-site runoff during the wet season collects in the seasonally inundated wetland areas and/or sheet flows to the drainage ditches. Wetlands A and H overflow to drainage ditch DD2, and Wetland B drains to the railroad track ditch. Other wetlands, such as Wetland E, do not generate runoff except during the most extreme events. During the dry season, all of the wetlands desiccate. Only drainage ditches DD1 and DD2 receive tidal water. Tidal waters extend in these ditches as far upstream as the on-site access road and not beyond. Off-site runoff from the upland slopes to the west enters the site from two locations: 1) at the southwest corner of Parcel A from a watershed area of 53 acres; and 2) at the northwest corner of Parcel A from an area of 20 acres. Regional runoff averages about 6 inches per year.

The Haystack Landing site is located within the Coast Range Geomorphic Province of California, where slopes developed on older bedrock meet the geologically-recent deposits of San Pablo Bay. The regional bedrock geology in the vicinity of the project site primarily consists of complexly folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock of the Jurassic- and Cretaceous-age Franciscan Complex. Tolay Volcanics of Miocene age outcrop in the region – most notably Burdell Mountain – and are found just northwest of the site in the area of the Dutra quarry Petaluma from which the source rock was extracted for aggregate processing (mapped by Blake and others, 1974). South of this Tolay Volcanics outcrop, Franciscan bedrock forms the shallow hills immediately west of the site. Quaternary alluvium

(Bay Mud marsh deposits) largely overlies bedrock within the Petaluma River valley lowlands, and soil types are underlain by valley alluvium and have clay hard pans. at the site, the artificial fill and wash deposits (deposited from quarry operations) overlie Bay Mud.

Natural soils developed in place before quarry fines were deposited and consisted of Reyes silty clay underlying much of the site, and Goulding cobbly clay loam along the western boundary of the site, rising from the lowlands to Highway 101 and beyond (Sonoma County Soil Survey, USDA, by Miller, 1972). Reyes silty clay developed on Bay Mud and low-gradient stream alluvium. Poorly drained, it is common in saline and brackish marshes surrounding the Bay. In contrast, Goulding soils are well drained and are found on hilly volcanic (andesite or basalt) bedrock west and south of the site. Goulding soils also extend from the site about a mile to the northwest, to the quarry from which the source rock was extracted for aggregate processing. Other soils further west of the site, on the low hills draining to the site from west of Highway 101 are also well drained. They consist of Diablo clay and Los Osos clay loam, which both commonly form on weathered Franciscan sandstone and shale.

The quarry fines on site consist of silts and clays washed from the material processed at the quarry, primarily composed of Tolay Volcanics with some outcrops of typical Franciscan bedrock. A geotechnical investigation of the tailings on the southern portion of the site designated for the proposed wetlands mitigation project was conducted by Miller Pacific Engineering Group (2004). Subsurface exploration was performed on May 21, 2004 and consisted of drilling 6 soil borings utilizing truck-mounted drilling equipment with 6-inch hollow-stem continuous flight augers.

The subsurface conditions encountered were consistent with the mapped geology and soils. Miller Pacific staff found 6.5 to 11.0 feet of variable artificial fill/wash sediments. The fill materials encountered consisted of soft to very stiff, high to low plasticity sandy and silty clays and dense clayey sands. Soft, highly compressible Bay Mud varying in thickness from 8.0 to 13.5-feet underlies the fill. Older alluvial deposits underlie the Bay Mud. These deposits consist of very dense sandy clays and stiff, medium to highly plastic, sandy silts and clays. Bay Mud thickness contours are consistent with the soils survey, which shows Bay Mud 'pinching out' along the western portion of the site.

The lowest ground-water levels (during late summer and fall) are expected to be near the Bay Mud surface or slightly higher (Miller Pacific Engineering Group, 2004). Ground-water conditions in winter can be variable, depending on amount of and the elapsed time since significant rainfall. To minimize these effects, we measured conditions three weeks into a typical mid-winter drought. Wet-season ground-water levels, as well as subsurface specific conductance (salinity) and temperature levels, were evaluated on February 4, 2005 by Balance Hydrologics, following this 3-week mid-winter dry spell after a 2-week period of heavy rainfall during early January. Within the tailings basins on the southern portion of the site, depth to water was 2 to 3 feet below ground surface in areas furthest from inundated wetland, and transitioning to approaching the ground surface at the wetlands.

III Habitat and Species Descriptions

A Plant Communities, Habitats, and Species

Botanical surveys were conducted on Parcel A of the Haystack Landing site on March 31 and June 6 and 11, 2003, and on Parcel B on April 30, 2004. Descriptions of the vegetative communities identified are provided below.

Parcel A

A total of 119 species of vascular plants were observed on Parcel A. Of these, 31 species are native to the site, and 86 species are non-native. For two species, it could not be determined whether or not the species is native to the site. One of these species (*Atriplex* sp.) could only be identified to genus at the time the survey was conducted and could be either a native species or a non-native species. Since there are no known rare *Atriplex* species in Sonoma County, a late-summer visit of the site was not made to positively identify the species. In accordance with CDFW's survey protocol, this plant was identified at the level necessary to determine its rarity status (that is, to the genus level). The other species, Pacific madrone (*Arbutus menziesii*), is native to the region, but may have been planted on this site.

Although recognition of habitat types on these parcels is somewhat arbitrary due to their highly disturbed nature, the following five habitat types were recognized: settling ponds, levees, drainage ditches, pond/seasonal wetland, and developed/ruderal. The first three of these habitat types encompasses the settling pond complex in the southern portion of the site. The developed/ruderal habitat type encompasses most of the remainder of the site. The pond habitat type characterizes the two small ponds near the western site boundary. With the partial exception of the pond habitat type, none of these habitat types could be considered "natural"; all have been created and/or maintained by intensive disturbance and large-scale alteration of the site, and they mostly do not resemble native vegetation types, although the drainage ditches habitat type is dominated by native species.

Brief descriptions of each habitat type are presented below.

Settling ponds. The beds that have developed on the settling ponds are gently sloping or somewhat undulating, so that some areas receive more seasonal inundation than others. The vegetation on the pond bottoms is a heterogeneous assemblage of native and non-native species, with both cover and species composition varying considerably over short distances. Much of this variation is clearly correlated with the exact elevation of particular portions of the pond bottom and the degree of seasonal inundation. The northern settling pond, which probably receives relatively little seasonal inundation, is densely vegetated (cover 100 percent or nearly so), primarily with non-native grasses and herbs. Characteristic species include Italian rye grass (*Lolium multiflorum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean barley

(*Hordeum marinum* ssp. *gussoneanum*), curly dock (*Rumex crispus*), bristly ox-tongue (*Picris echioides*), soft chess (*Bromus hordeaceus*), black mustard (*Brassica nigra*), yellow star thistle (*Centaurea solstitialis*), winter vetch (*Vicia villosa* ssp. *varia*), and, in the lowest areas, annual beard grass (*Polypogon monspeliensis*). Scattered individuals of the native shrub coyote brush (*Baccharis pilularis*) occur in this settling pond. One large clump (perhaps a single clone) of arroyo willow (*Salix lasiolepis*) occurs in the northeast portion of this settling pond.

In the southwestern settling pond, which receives more seasonal inundation than the northern settling pond, the higher areas are largely dominated by Italian rye grass, and the associates are mostly non-native, with a species composition similar to that of the northern settling pond. The non-native thistle Italian thistle (*Carduus pycnocephalus*) occurs in scattered dense patches in this area. There is considerable yellow star thistle at the south end, and the escaped ornamental species sweet pea (*Lathyrus odoratus*) is locally abundant in the northeast corner. Lower-lying areas in this settling pond are dominated by the native pickleweed (*Salicornia virginica*), the native perennial grass saltgrass (*Distichlis spicata*), and the non-native species annual beard grass and brass buttons (*Cotula coronopifolia*).

The southeastern settling pond is probably similar to the southwestern settling pond in the degree of seasonal inundation, although the lowest-lying portion on the east side apparently has standing water for a longer period than any other portion of the settling ponds. The higher portions of this settling pond are largely dominated by weedy non-native grasses, including ripgut grass (*Bromus diandrus*), six-weeks fescue (*Vulpia bromoides*), soft chess, slender wild oat (*Avena barbata*), Mediterranean barley, and Italian rye grass, with considerable bird's-foot trefoil and Italian thistle; cut-leaved geranium (*Geranium dissectum*) is also locally abundant. Somewhat lower-lying areas are dominated by bird's-foot trefoil, annual beard grass, and pickleweed, with considerable bare ground, or by annual beard grass and bristly ox-tongue. The lowest-lying area is overwhelmingly dominated by annual beard grass, with sour clover (*Melilotus indica*) and pickleweed the only abundant associates. A small amount of narrow-leaved cattail (*Typha angustifolia*), a species generally indicating prolonged inundation, occurs in the southeast corner.

Levees. The levees are elevated linear features that separate the settling ponds from each other and from bordering areas. These levees could have been included in the developed/ruderal habitat type, but, because they form a distinct part of the settling pond complex, they are treated separately. Dense clumps of coyote brush occur locally on the levees, and a dense patch of the invasive non-native shrub French broom (*Genista monspessulana*) occurs at one location on the levee between the northern and southwestern settling ponds. The levees are otherwise largely vegetated by weedy non-native herbs and grasses, including fuller's teasel (*Dipsacus fullonum*), poison-hemlock (*Conium maculatum*), purple vetch (*Vicia benghalensis*), Italian rye grass, Mediterranean barley, and yellow star thistle. Sweet pea is locally abundant on the levees bordering the southwestern and southeastern settling ponds.

Drainage ditches. Drainage ditches occur adjacent to some of the levees. These ditches are artificially excavated and hold standing water permanently or for varying periods primarily during the season. Where vegetated, the species composition of the drainage ditches consists mostly of native moisture-loving species, principally cosmopolitan bulrush, narrow-leaved cattail, pickleweed, cord grass (*Spartina* sp.), and saltgrass.

Pond. The two small ponds located near the western boundary of the site apparently hold water for all, or at least most, of the season. Narrow-leaved cattail and annual beard grass are relatively abundant, especially around the margins of these ponds, with brass buttons also relatively abundant around the southern pond. Several individuals of arroyo willow occur around the margins of the northern pond.

Developed/ruderal. The developed/ruderal habitat type includes the entire site north of the northern settling pond and its associated levee and ditch, as well as a narrow strip of land between the settling ponds and the Highway 101 right-of-way. The northern, most elevated portion of the site supports an assemblage of species that is quite heterogeneous in both species composition and physiognomy, but that consists primarily of weedy species. Some areas have been repeatedly mowed; these areas are vegetated with a low, rather sparse cover. Where not mowed, the vegetation is tall and generally dense. Numerous large, planted trees of the non-native species English elm (*Ulmus procera*), Northern California black walnut (*Juglans californica* var. *hindsii*, native to Northern California but not indigenous to this site), and non-native blue gum (*Eucalyptus globulus*) are scattered in this area. The first of these is reproducing by suckers, while the latter two species have reproduced from seed. Two large valley oak (*Quercus lobata*) trees, a native species, are located on the north side of the abandoned house. Several dense clumps of the tall, robust non-native grass giant reed (*Arundo donax*) occur near the border of Parcel A.

The north central portion of Parcel A is largely unvegetated; the margins and several adjacent dirt piles are sparsely to moderately densely vegetated by weedy species. Between this parking lot and the northern settling pond is a level area with hard-packed soil, probably graded in the past, with a low to tall, sparse to locally dense vegetation, mostly of weedy species. There are a number of small Pacific madrone trees (*Arbutus menziesii*) in this area, perhaps planted, as well as one small individual of the native tree species coast live oak (*Quercus agrifolia*). The strip of ruderal habitat between the settling ponds and Highway 101, which is interrupted by the two small ponds, is vegetated with a mostly dense cover of weedy species.

Parcel B

A botanical survey was conducted on Parcel B on April 30, 2004. In 2004, this parcel was primarily dominated by ruderal grasses and herbs with scattered individuals of the native coyote bush. The narrow and discontinuous strip of land bordering the river (which is evidently brackish in this area due to tidal flow) is occupied by a coastal brackish marsh habitat type. Within the study area, this habitat type is not well-developed and contains few species, due to its relatively small area and to the frequent flooding and scouring from the river, but it is dominated by native species, particularly three species of tule or bulrush: cosmopolitan bulrush, viscid tule (*Schoenoplectus acutus*), and three-square (*Schoenoplectus americanus*). Associates include the rhizomatous, perennial saltgrass and the succulent pickleweed.

Landing Way Mitigation Area

One seasonal wetland covering a total area of 0.47 acre occurs on the area to be decommissioned as part of the proposed project. The majority of the wetland area is dominated by non-native grasses and herbs including rip-gut brome (*Bromus diandrus*), soft-

chess brome (*Bromus hordeaceus*), oat (*Avena barbata*), bristly ox tongue (*Picris echioides*), poison hemlock (*Conium maculatum*), and Italian rye grass (*Lolium multiflorum*). "Wetter" portions of the wetland area are dominated by facultative and facultative wetland species including fox-tail barley (*Hordeum murinum* ssp. *gussoneanum*), and rabbit's foot grass (*Polypogon monspeliensis*).

Special-status Plant and Animal Species

No special-status species plant or animal species are known to occur on the project site but some do occur in the vicinity, including Ridgway's rail, California black rail, and salt marsh common yellowthroat.

IV Monitoring and Management

The overall goal of implementing the tasks specified in this plan will be to monitor the wetland habitats in a manner that will foster the long-term viability of these resources and the wildlife habitat functions and values they provide.

A Implementation Management

The land manager will install three-strand barbed wire fencing along the perimeter of the property following completion of construction. One access gate will be installed at the western portion of the mitigation area adjacent to the asphalt plant for the purpose of easy access by land managers and monitors. In addition, this access gate will provide vehicular access for mowing and other management activities. Emergency vehicles could also access the site through this gate if needed.

B Interim and Long-term Monitoring and Management

Both interim and long-term monitoring and management activities will include fence maintenance and repair, weed control, fire management, trash collection, and other tasks as described in this plan. Long-term monitoring and management responsibilities assumed by the designated land manager (payee) will be funded by the endowment dedicated to the trustee for this project.

C Biological Resources

The primary goal of the management program is to preserve wetland habitats. The wetland habitats will be qualitatively monitored on an annual basis to assess general conditions and trends as specified in the mitigation plan for the project. The primary aspects that will be monitored and may require management actions are erosion, invasion by exotic species, water quality, vegetation management, and fire hazard.

Toward the long-term protection of the site's biological resources, the following are specific measures to be implemented during the initial and long-term management of the site:

Element 1- Invasive Species

Goal: Monitor and maintain control over major noxious weeds and/or other strongly invasive plants or wildlife on the site that diminish site quality.

Task: Each year an annual walk-through survey will be conducted and include a qualitative assessment of potential or observed weed invasions, primarily in or around the wetlands. Non-native species occurring in some abundance, at least locally, include pepperweed (*Lepidium latifolium*), curly dock (*Rumex crispus*), common knotweed (*Polygonum arenastrum*) and Italian rye grass.

Adaptive management techniques will be adopted and implemented annually based on monitoring the abundance and distribution of previously treated invasive non-native plants and/or the identification of new species. Common adaptive management techniques utilized for seasonal wetland and upland chaparral habitat include: 1) targeting specific invasive non-native species for aggressiveness, invasiveness, ability to outcompete, or alter hydrologic conditions; and 2) focus on specific habitat locations (i.e. wetlands, or buffer ecotone regions), depending on the distribution and/or specific species of invasive non-native plant or native plant diversity goal for that habitat. For pepperweed, colonies of pepperweed that exceed 10 percent cover will be sprayed with an aquatic approved herbicide each spring before the plants flower. Within 2-3 weeks following the first spray, the basal portion of the plant will then be resprayed. This should effectively kill the plant.

In addition, qualitative assessment of cordgrass (*Spartina* spp.) colonization at the site will be conducted at least once annually. This invasive plant can quickly become established in restoration marshes and has resulted in mitigation project failures. Since the non-native species of cordgrass are nearly impossible to distinguish from the native species, periodically the vegetation monitor should collect some cordgrass samples onsite and take it to the members of the volunteer *Coastal Conservancy Spartina Project* to have the DNA of this plant checked to determine if the non-native cordgrass has become established onsite. If non-native cordgrass is identified within the mitigation area, the *Coastal Conservancy Spartina Project* can implement remedial action measures to remove this plant from the mitigation site as part of its volunteer program.

Element 2 - Vegetation and Fire Management

Goal: Maintain vegetation height and composition similar to the targeted habitat types. In addition, maintain site as required for fire control but limiting impacts on site biological values. Target species to be controlled include sweet fennel, poison hemlock, Italian thistle, star thistle, pampas grass, French broom, Scotch broom, eucalyptus (with the exception of the eucalyptus that historically supported egrets), stinkwort, giant reed, non-native cordgrass, pepperweed, acacia and other common exotics. Suppress weedy species to maintain higher quality habitat.

Task: Conduct 3 annual visits (early spring, summer and early fall) to monitor weeds. Implement any methods that are allowed and cost effective that have the least impacts to site biological resources. Preferred methods for removal would be hand removal or targeted use of herbicides designed for use in sensitive wetland areas. Small mowers or weed whackers may be used on adjacent buffer zones dominated by upland grasses as long as plantings are not affected. Disking is not to be used for fire control. Keep track of any trends in particular invasive species and target those most aggressive. Include observations in annual report.

D Security, Safety, and Public Involvement

The site will have no general public access or any regular public or private use. Fencing around the perimeter of the site is the most vulnerable portion of the site to potential trespass.

Potential mosquito issues associated with wetland habitats will be addressed through the provision of access to the Marin-Sonoma Mosquito and Vector Control District staff and through management of the wetlands for minimal mosquito production.

Potential wildfire fuel (dry grass) will be reduced as needed by mowing in areas where appropriate as specified in Element 2 above.

Element 3 - Trash removal and trespass

Goal: Monitor sources of trash and trespass 3 times a year. Collect and remove trash, repair vandalized structures, and rectify trespass impacts.

Task: Collect and remove trash and repair and rectify vandalism and trespass impacts.

E Infrastructure and Facilities

Fence and gate maintenance and repair frequency will be dependent on trespass and access control issues.

Element 4 - Fence Repair and Replacement

Goal: Monitor condition of fences. Maintain fences to prevent casual trespass, allow necessary access, and facilitate management.

Task A: During each site visit, record condition of fences. Record location, type, and recommendations to implement fence repair or replacement.

Task B: Maintain fences as necessary by replacing posts, wire, etc.

Element 5 – Gate Repair and Replacement

Goal: Monitor condition of gate. Maintain gate to prevent casual trespass, allow necessary access, and facilitate management.

Task A: During each site visit, record condition of gate. Record location, type, and recommendations to implement gate repair or replacement.

Task B: Maintain gate and replace as necessary.

F Habitat Assessment

Site and habitat conditions should be evaluated with the goal of maintaining biological resource values on the site. Elements of site and habitat conditions that should be evaluated include drainage of wetland areas to wetlands on adjacent properties. Maintenance of the culvert under the Sonoma Marin Area Rail Transit tracks will be conducted by railroad employees during their regular maintenance and operation activities and is not the responsibility of the land manager.

Element 6 – Habitat inspection and site evaluation

Goal: Maintain and potentially enhance habitat quality over time.

Task A: Walk project site and evaluate wetland habitats. Record observations and general assessment of habitat conditions, particularly those habitats adjacent to access roads and wetland habitats on adjacent properties. Note condition of access road and potential erosion or sedimentation problems and provide written recommendations regarding remedial measures as appropriate.

G *Reporting and Administration*

Element 7 – Annual Report

Goal: Provide annual report on activities conducted and general site conditions to USACE.

Task A: Prepare annual report summarizing results of monitoring and maintenance and any key problems or issues. Remedies for problems should be provided. Complete and circulate to agencies and other parties by February 15 of each year for review and approval of proposed actions.

Task B: Make recommendations with regard to (1) any habitat enhancement measures deemed to be warranted, (2) any problems that need near term attention (e.g., weed removal, fence repair, erosion control), and/or (3) any changes in the monitoring or management program that appear to be warranted based on monitoring results to date.

V Transfer, Replacement, Amendments, and Notices

A *Transfer*

A conservation easement and associated management responsibilities specified in this plan will remain in effect should the property be transferred to another party. The property cannot be transferred without trustee concurrence and the new owner must agree to follow the terms of the conservation easement for the site.

B *Amendments*

Amendments to this plan designed to better meet management goals and preserve the habitat and conservation values of the property will only be allowed with the approval of the trustee in cooperation with the land manager. Any amendments must be approved in writing by the trustee. Any amendments to the plan shall be implemented without any additional cost to the land manager.

VI Funding

Based on the tasks specified in this plan, there will be costs associated with the long-term management for the site. These include estimates to conduct weed and fire abatement, trash removal, fence repair, and funding needed to fully replace the fences. Estimated costs for long-term maintenance will be provided in the form of an endowment matrix prior to groundbreaking. This funding estimate will require approval by the Corps for the project.

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